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Proceedings of the Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks

31 October – 3 November 2005
Hache Conference Centre
St. Andrews Biological Station
St. Andrews, NB

Julie M. Porter
Meeting Chairperson

Compte rendu du processus consultatif régional des provinces Maritimes sur les stocks de poisson de fond de Scotia-Fundy

31 octobre au 3 novembre 2005
Centre de conférence Hache
Station biologique de St. Andrews
St. Andrews, (N.-B.)

Julie M. Porter
Présidente de réunion

Fisheries and Oceans Canada
Biological Station
531 Brandy Cove Road
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Foreword

The purpose of these proceedings is to archive the activities and discussions of the meeting, including research recommendations, uncertainties, and to provide a place to formally archive official minority opinions. As such, interpretations and opinions presented in this report may be factually incorrect or mis-leading, but are included to record as faithfully as possible what transpired at the meeting. No statements are to be taken as reflecting the consensus of the meeting unless they are clearly identified as such. Moreover, additional information and further review may result in a change of decision where tentative agreement had been reached.

Avant-propos

Le présent compte rendu fait état des activités et des discussions qui ont eu lieu à la réunion, notamment en ce qui concerne les recommandations de recherche et les incertitudes; il sert aussi à consigner en bonne et due forme les opinions minoritaires officielles. Les interprétations et opinions qui y sont présentées peuvent être incorrectes sur le plan des faits ou trompeuses, mais elles sont intégrées au document pour que celui-ci reflète le plus fidèlement possible ce qui s'est dit à la réunion. Aucune déclaration ne doit être considérée comme une expression du consensus des participants, sauf s'il est clairement indiqué qu'elle l'est effectivement. En outre, des renseignements supplémentaires et un plus ample examen peuvent avoir pour effet de modifier une décision qui avait fait l'objet d'un accord préliminaire.

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SUMMARY

Each fall, the DFO Maritimes Science Branch reviews the status of Scotia-Fundy groundfish stocks. The following resources were reviewed in 2005: 4VWX5Zc pollock, 4X/5Y cod, 4X/5Y haddock, 4VWX5 white hake, 4VWX silver hake. The 2005 RAP fall review was split into two sessions: RAP Data Input Meetings (18 October, Yarmouth) and RAP Scientific Peer Review (31 October - 3 November, St. Andrews Biological Station). The intention was (1) to formalize the consultation aspect of the RAP process and (2) to ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The RAP Data Input Meetings were about 2 weeks before the scientific peer review: late enough to allow time to have the data inputs ready, but early enough so there was time before the Peer Review meeting to incorporate the feedback from the Data Input Meetings. This document contains the Proceedings from the RAP Scientific Peer Review Meeting, and the Report of the RAP Data Input Meetings is an appendix to this Proceedings.

SOMMAIRE

Chaque automne, la Direction des sciences du MPO, Région des Maritimes, examine l'état des stocks de poisson de fond de Scotia-Fundy. En 2005, les ressources suivantes ont été évaluées : goberge (4VWX5Zc), morue (4X/5Y), aiglefin (4X/5Y), merluche blanche (4VWX5), merlu argenté (4VWX). L'examen d'automne dans le cadre du PCR pour 2005 a été divisé en deux temps, à savoir les réunions d'examen des données du PCR (le 18 octobre à Yarmouth) et l'examen scientifique par les pairs (du 31 octobre au 3 novembre à la Station biologique de St. Andrews). L'examen avait pour but : (1) d'officialiser l'aspect de consultation du PCR et (2) de faire en sorte que la rencontre de l'examen scientifique par les pairs se concentre sur l'examen scientifique par les pairs et l'interprétation des renseignements. Les réunions d'examen des données du PCR ont eu lieu environ deux semaines avant l'examen scientifique par les pairs, suffisamment tard pour donner le temps de préparer les collectes de données, mais suffisamment tôt pour donner le temps d'inclure les suggestions ressorties des rencontres sur les données dans la rencontre de l'examen scientifique par les pairs. Le présent document comprend le compte rendu de la réunion d'examen scientifique par les pairs. Le rapport des réunions d'examen des données du PCR est en annexe.

INTRODUCTION

Meeting Chair, J.M. Porter, welcomed participants (Appendix 1) and reiterated the formal invitation (Appendix 2). The Agenda (Appendix 3) and remit (Appendix 4) for the meeting were reviewed. She noted that the assessment for 3NOPs4VWX Atlantic Halibut was postponed to January 2006.

Each fall, the DFO Maritimes Science Branch reviews the status of Scotia-Fundy groundfish stocks. The following resources were reviewed: 4VWX5Zc pollock, 4X/5Y cod, 4X/5Y haddock, 4VWX5 white hake, and 4VWX silver hake. The Chair advised participants that for each of the stocks under review, there was a working paper available (Appendix 5). In addition, the Proceedings of the 2004 fall groundfish RAP was available to the meeting.

The 2005 RAP fall review was split into two sessions: RAP Data Input Meetings (18 October, Yarmouth) and RAP Scientific Peer Review (31 October - 3 November, St. Andrews Biological Station). The intention was (1) to formalize the consultation aspect of the RAP process and (2) to ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The RAP Data Input Meetings were about 2 weeks before the scientific peer review: late enough to allow time to have the data inputs ready, but early enough so there was time before the Peer Review meeting to incorporate the feedback from the Data Input Meetings (Appendix 6).

The objective of the meeting was to address the issues on the remit (Appendix 4) and to develop scientific consensus through peer review. The Chair noted that this RAP session produces three different documents: Science Advisory Reports (SARs, formerly SSRs), Research Documents (Res. Docs.), and a RAP Proceedings document (this document).

During the meeting, each working paper (Appendix 5) was presented by one or more of the authors, followed by a discussion of that paper. Rapporteurs were assigned to summarize these discussions. In addition, research recommendations were discussed, although only briefly, given the current resource limitations in the Department. Finally the texts of the SARs for 4VWX5Zc pollock, 4X/5Y cod, 4X/5Y haddock, 4VWX5 white hake, and 4VWX silver hake were drafted and agreed to by consensus. The meeting was initially scheduled for 4 days, but the work was completed in only 3.5 days. The Proceedings were subsequently adopted by correspondence (Appendix 7).

Participants were reminded that RAP is a forum for scientific review and that management issues would not be considered, and that RAP deliberations and conclusions would not be finalized until the SARs had been made public.

FISHERIES DISTRIBUTION

Background

Following the RAP Data Input Meetings, a general overview of the Scotia-Fundy groundfish fisheries was prepared and presented.

Presentation Highlights (Presenter: D. Clark)

This was a descriptive representation of the distribution of the groundfish fisheries by year and species. The distribution of the 4X groundfish fishery has changed over time, and now is more concentrated in the Gulf of Maine and the Bay of Fundy. The species composition captured on most fishing grounds has also changed with time, and continues to change. Areas in eastern 4X which were fished for pollock in the early 1990's continue to be fished, but now only silver hake and redfish are caught. Some areas which, prior to 2003, reliably produced catches dominated by haddock are no longer haddock-dominated. A number of distribution maps were shown to illustrate the temporal and spatial patterns of fisheries distribution in this multi-species fishery. The presentation did not address effort.

Discussion (Rapporteur : C.J. Allen)

Some discussion revolved around whether or not past distribution of stocks could be used to predict their future distribution patterns. Though in 2003, RAP concluded species composition on given grounds could be predicted seasonally for the coming year, and from this we could indicate where and when fishermen could generally catch the species mix needed. Based on this, the 2003 SSR included a table listing areas and seasons where high levels of haddock in the catch could be expected. One of the conclusions from the 2005 presentation was that the geographic area and temporal period where haddock dominated the landings had decreased since 2003. There are now few areas where industry can get catches which are predominantly haddock, and we would not anticipate this improving for 2006.

Industry participants noted that when a fishery is shut down because of bycatch of another species, whole fleets must shift to other species or areas. The presentation did not clearly show this. They also explained that the fisheries are very different now than in 1992 so the data is bound to be different over this time period. For instance, generally fishers must now avoid catching pollock. The presentation was basically a description or snapshot of the fisheries and much has to be taken into account to explain what is seen. The presentation was not meant to show why we saw the observed patterns.

It was agreed that caution must be exercised when interpreting fisheries data (catch rate information was not included in the presentation). The situation is complicated and one cannot simply look at fish distribution but also be aware of what management strategies are in place that can have a significant role to play in interpreting statistics.

It was agreed that there seems to be shrinking distribution in some fisheries which should be looked at in individual assessments, if possible, as they are addressed during this session.

4VWX5Zc POLLOCK

Remit

- Report on the status of Southwest Pollock (DFO Unit Areas 4Xopqrs and 5Yb and NAFO Subdivision 5Zc), updating results for the latest information from fisheries, including all bycatch and discard estimates, and from research surveys.
- For a range of Southwest Pollock TAC options in 2006/07, estimate the risk that the
  - 2006/07 fishing mortality rate would exceed the $F_{ref} = 0.2$
  - biomass at the beginning of April 2007 would not achieve a 0%, 10% or 20% increase compared to the beginning of April 2006
- Report on the status of North-eastern Pollock (NAFO Divisions 4VW and DFO Unit Areas 4Xmn), updating results with the latest research survey for trends of abundance, total mortality rates and biomass ratio of North-eastern to South-western Pollock.
- Examine the implications on the biological stocks as defined in the assessment framework of maintaining the current management unit. Comment on how Fisheries Management could accommodate these implications.

Working Paper: Neilson, J.D. and P. Perley. 2005. 2005 Assessment of Pollock in 4VWX and 5Zc. RAP Working Paper 2005/024.

Presentation Highlights (Presenter: J. Neilson)

Landings of pollock in the 4VWX5Zc fishery in 2005/06 are 4698 t as of 27 October, against a quota of 6500 t. An assessment was completed using input data through the second trimester of 2005. Reduced quotas and harvests have contributed to a decline in fishing mortality rates for older fish (ages 6-9), but fishing mortality remains high, and above the F_{ref} of 0.2. Biomass declined from about 60,000 t in 1984 to about 10,000 t in 1999. Biomass has been rebuilding since 1999, doubling to about 20,000 t in 2003, but the rebuilding has been arrested. The fishery weight at age has been decreasing from about 1984, and the trend is most apparent for the younger ages (ages 3-5). The 1999 yearclass was the strongest at age 2 since 1990. Initial indications for the 2002 yearclass are that it is the weakest in the series. If the 2002 yearclass is as weak as estimated, biomass will decrease in 2006 to 13,000 t, before increasing again to about 17,000 t in 2007. The range of harvest strategies in the fishing year that are risk averse (25% risk of exceeding F_{ref}) to risk neutral (50% risk of exceeding F_{ref}) are about 1400 to 1800 t. Several factors indicate a more conservative harvesting strategy is urgently required. The achievement of rebuilding objectives for cod and pollock may constrain the harvesting of haddock.

Discussion (Rapporteur: P. Perley)

Fishery

In past years, there was a distinction between the offshore and inshore gear sectors. The offshore sector have chosen not to use some of their quota and now use TC 1-3 vessels to fish the offshore quota.

In past years, some gear sectors were restricted by the TAC but generally the quota was not achieved. Last year, the ITQ fleet caught 99% of their quota and the gillnet sector caught most of their allocation but not the offshore. Generally with a TAC of 10,000 t the fishery was not restrictive with lots of transfer of catches between sectors. Mobile gear sectors also commented

about a significant change in fleet activity in the Bay of Fundy due to the presence of lobster gear as of 1 November.

In regard to the gillnet fishery, there was some question of a change in geographic distribution in recent years, but without representation from that gear sector, this question could not be answered.

The eastern pollock stock component (4VW) has gone through periods of low abundance as is the case now. There is no directed fishery in the east except for redfish and silver hake. There was concern from industry about the lack of a fishery in the east as well as in the Bay of Fundy. Comments were made to the effect that the fishery is now in one major area (4Xp and 5Zc) and that no small pollock are being seen around the wharves in the Bay of Fundy area and that these changes have implications to local communities. These views are in contrast to industry reports from the southwest Nova Scotia area, where there were reports of plentiful pollock in nearshore waters. Science responded that information continues to be captured from the areas where there are fisheries and try to take the geographic information into consideration. Pollock do not appear to be in the same areas, landings are down and the distribution of the fishery appears to be shrinking.

Weight at Age

The trend in the weight at age shows a decrease in the past couple of years. The first two trimesters account for most of the weight at age since they represent most of the catch. During the meeting, the question was raised about the influence of the third trimester on weight at age calculations used for projections. An analysis was conducted which indicated only a small difference in weight at age calculations with and without the third trimester data, and it was concluded that the difference was minimal and would not affect projections. It was therefore concluded that 2005 information would be included in the projection calculations (see *VPA results*).

Industry expressed concern that pollock are moving to the west. This is a source of uncertainty since the summer survey does not cover the area around Georges Bank. There were some suggestions, such as augmenting the survey to include this area or to initiate an industry survey which would cover eastern Georges Bank. This could not be resolved at this assessment.

Survey Biomass Indices

Concern was expressed that pollock, being a semi-pelagic, schooling species, are less well sampled by the summer RV survey than other gadids. If the Georges Bank pollock catches continue to be important in the overall fishery, then the current indices do not adequately cover that area. Therefore, if the fishery continues on Georges bank, there is a need for a survey to cover this area – either by industry or an extended RV survey; otherwise this will continue to be a deficiency.

VPA Results

The use of the *Teleost* data in the survey indices was discussed. After reviewing a preliminary analysis of the 2005 comparative data (*Needler* vs. *Teleost*), the general consensus was to include the 2004 *Teleost* observations since it seemed unlikely that the effect of the vessel would be important given the variability which normally occurs in the survey data. Further analysis will be conducted at a later date. Also, given that two years of data have been added

since the last assessment (2004 and 2005 survey data), it was noted that the current results are consistent with the 2004 assessment.

Projections

There was discussion of the curves on the risk plot and the steepness of the biomass line, and the extent that the steepness was influenced by an assumed yearclass. It was also noted that the steep biomass line was somewhat misleading, given the impact of assumed recruitment and the fact that biomass was very low. The assumed recruitment was resulting in 25% of the biomass and the consensus was to leave it in the Res. Doc. and explain that it does not account for the recruitment uncertainty. However, for the SAR, only the fishing mortality line was shown. For the projections, it was decided to use a three year average including the partial year in 2005 for the partial recruitment, average fishery weights at age and beginning of year weights at age, rather than the five year average used in the framework assessment. For the partial recruitment, it was discussed whether or not this was the best approach since more of the otter trawl quota is being utilized thus decreasing the proportion of catch coming from the gillnet fishery. Upon examination at the meeting, it was found that the proportion of gillnets in 2005 actually increased over 2004.

Eastern Component

For the eastern component, while the survey index increased, it was agreed there should be no directed fishery in this area until a secure rebuilding has been established.

Research Recommendation

It was recommended that the landings be taken back to 1960 and split into east and west, if possible.

It was agreed that the working document be revised and completed as a **Research Document**.

4X/5Y COD

Remit

- Evaluate the completeness and accuracy of fishery statistics for cod in 4X/5Yb for 2004/05, commenting on implications for status determination.
- Determine if the biomass and fishing mortality rate of cod has increased or decreased. Evaluate the prospects for rebuilding if catches are maintained at the current TAC of 5,500t. Provide details for the Bay of Fundy and Scotian Shelf separately.

Working Paper: Clark, D.S. 2005. Assessment of Cod in Division 4X in 2005. RAP Working Paper 2005/022.

Presentation Highlights (Presenter: D. Clark)

The TAC from 2000-2004 was 6000 t annually and landings dropped to the lowest recorded in 2004 at 4700 t. On the Scotian Shelf, the recruitment index for the 2003 yearclass was the highest since 1994, while in the Bay of Fundy it was higher than most in the past decade. Biomass for 4X cod has likely declined since 2000 when the quota was reduced to 6000 t to promote rebuilding.

There has been no indication of a decline in total or relative fishing mortality since 2000. Prospects for rebuilding are very dependent on the incoming 2003 yearclass. To conserve this yearclass, fishery removals should be reduced to the lowest level practicable. The achievement of rebuilding objectives for cod and pollock may constrain the harvesting of haddock.

Discussion (Rapporteur: H. Stone)

Fishery

Observer coverage for the 4X groundfish fishery has been extremely low over the past five years (i.e., <4% for otter trawl and <1% for longline) and has not been applied in a manner which would be consistent with landings from the commercial fishery. Of the available observed trips in the Industry Surveys Database, very few are specifically for vessels which direct for cod.

The issue of cod bycatch in other fisheries, i.e., inshore lobster, offshore lobster and herring purse seine, was discussed. Cod bycatch in lobster traps may be increasing because of the larger ring size used in traps for fishing lobster in deeper waters, but it is not possible to get enough observer coverage to obtain a true picture of the bycatch in this fishery. There is evidence from tagging studies that cod survive after being captured and released from lobster traps. By regulation, all cod bycatch in the lobster fishery is supposed to be released alive, however, some lobster fishermen may use these fish for bait. Therefore, it is difficult to determine the true mortality rate. It was indicated that the herring purse seine fleet had some level of cod bycatch in 1970s but the amounts are assumed to have been low, and were likely not recorded; the current level of cod bycatch in this fishery is not known. Cod bycatch from the inshore scallop fishery is not a concern.

It was noted that while the recent landings statistics for cod appear to be complete and accurate, there has been some unknown degree of discarding and unreported landings in the past. With current low landings, it is believed that there is little discarding at present. However, without an appropriate level of monitoring in place for both directed and non-directed fisheries, there is no way of corroborating catch composition. Discards have not been included in catch at age calculations and the point was made that this omission of discards from the past can influence the interpretation of reconstructed population trends. Better and more effective monitoring (especially for Georges Bank) was suggested as a way of capturing this information in the future.

It was noted that there has been a general decline of all groundfish stocks in coastal areas in recent years, suggesting that coastal stocks are being affected by environmental changes or overfishing. Groundfish catches from coastal hand line and longline fisheries declined in early 1990s and are not showing any signs of recovery. Tagging information from the Gulf of Maine cod tagging initiative may help to clarify seasonal movement patterns and the discreteness of these coastal stocks. However, it was pointed out by one of the study participants (D. Clark) that it was difficult to find fish to tag from these inshore areas.

There were a number of observations by the fishing industry that landings and effort are both down in 2005. During the RAP Data Input Review Meetings in Yarmouth, it was noted that in 2005 there were not as many cod in Georges Basin in April to mid-May. At the present meeting, fixed gear fishermen also noted that there is very little fish inshore, either around Southwest Nova Scotia, or in the Bay of Fundy. Some expressed concern over the reduction in area where cod can be caught, and the lack of old fish in the population.

Catch at Age

Concern was expressed that much of 2005 catch is based on the 2001 yearclass (age 4), with most landings coming from the Bay of Fundy. The 2001 yearclass is considered to be an important one; this yearclass appears to be fairly widespread geographically and has not been fished as heavily on the Scotian Shelf compared to the Bay of Fundy, due to smaller size at age. Concern was also expressed over the incoming 2003 yearclass, which needs to be conserved in order to allow for future stock rebuilding. It was noted that the 4X cod stock is currently in precarious state.

Cessation of fishing may not arrest the decline in the 4X cod stock as there may be other factors or linkages which are influencing the decline. For example, gaspereau and herring are prey items of cod and their relative abundance appears to be decreasing as well. There may be other environmental/ecosystem effects which could be affecting cod survival which need to be investigated. It was noted that the 4VW cod stock is experiencing high mortality even in the absence of a fishery so there are other factors influencing the survival of this stock. Nevertheless, fisheries should be managed in a manner that promotes rebuilding and that does not contribute to further biomass decline.

If the cod quota declines, enhanced monitoring at-sea will be required to manage discarding. Therefore, dropping the quota, without additional monitoring, may not be the best way to proceed. There is a need to look at the bycatch of cod in other fisheries and the suite of groundfish stocks which are fished together. Time/area closures may provide the means to avoid overfishing certain stock components. It was noted that in addition to good research, there needs to be adequate management in place to regulate total removals and to effectively monitor what is being removed.

Survey Biomass Indices

The RV survey indices reflect the high abundance of the 2001 yearclass observed in the catch at age as well as the presence of the 2003 yearclass, especially on the Scotian Shelf. The high catch at younger ages is the main benefit of the ITQ survey which uses smaller roller gear (and therefore catches a greater proportion of smaller sized fish) compared to the RV survey. The fixed station sampling design used in the ITQ survey has not changed since mid-1990s. Since the RV and ITQ surveys do not capture fish of the same size range, the signals from these two surveys for overall biomass exhibit somewhat different general trends and are either stable or decreasing. This indicates that attempts at a rebuilding strategy have not produced results.

In general, yearclasses correlated age by age for the two surveys appear to match reasonably well. While the decline in population biomass evident during early 1980s (from catches) is not shown by the surveys, it was noted that the survey data are more appropriate for interpreting biomass trends in the recent period.

Trends in F and Z

Although catches have been fairly low recently, there are still no signs of a reduction or decline in F. Observations from the fishery indicate an absence of older fish. Even with low landings there has been no improvement with survey trends, so the outlook is very pessimistic.

The group warned that the precariousness of this stock cannot be overstated. The 1998 yearclass has been removed and now only the 2001 yearclass is left which is of any

consequence for stock rebuilding in the near term. There should be many more yearclasses for a cod population which has such low catches. The catch at age is truncated at younger ages and trends in Relative F, Z and biomass all indicate a pessimistic outlook for this stock.

Research Recommendation

It was proposed that the cod bycatch from other fisheries (i.e., lobster, herring) should be examined using available data to determine what extent cod are captured in these fisheries.

It was agreed that the working document be revised and completed as a **Research Document**.

4X/5Y HADDOCK

Remit

- Evaluate the completeness and accuracy of fishery statistics for haddock in 4X/5Yb for 2004/05, commenting on implications for status determination.
- Given apparent changes in growth rate and productivity of the 4X haddock resource, describe the implications for harvest strategy.
- Determine if the biomass and fishing mortality rate of haddock has increased or decreased. Evaluate the prospects for rebuilding if catches are maintained at the current TAC of 8,000t. Provide details for the Bay of Fundy and Scotian Shelf separately.

Working Paper: Hurley, P.C.F., G.A.P. Black, G.A. Young, R.K. Mohn, and P.A. Comeau. 2005. Assessment of the Status of Division of 4X/5Y Haddock in 2005. RAP Working Paper 2005/023.

Presentation Highlights (Presenter: P. Hurley)

Landings of 4X/5Y haddock in the fishing year ending 31 March 2005 were 5946t relative to a quota of 10,000t. The 1998, 1999, 2000 and 2003 yearclasses are all strong. Spawning stock biomass increased to 54,000t in 2003 and has decreased slightly in 2005. Since 1994, fishing mortality has been below $F_{0.1}$. Relative fishing mortality shows a declining trend on the Scotian Shelf but remains relatively stable in the Bay of Fundy. Exploitation in the Bay of Fundy may be too high and is hampering rebuilding. If catches are maintained at the current TAC of 8000 t, fishing mortality will remain below $F_{0.1}$ and spawning stock biomass will decrease from 2006 to 2007. Mean sizes at age in the RV survey have been decreasing since the mid-1970s and many ages are at or near the smallest size observed in the time series. Under the current growth regime, productivity is about two thirds of what it was in the 1970s. There would be no increase in yield by delaying harvest of this resource to older ages. The achievement of rebuilding objectives for cod and pollock may constrain the harvesting of haddock.

Discussion (Rapporteur: S. Gavaris)

Remit

The reference to "rebuilding" in the remit requires clarification as the biomass is estimated to be high relative to the assessment time series. For populations where the abundance and biomass are near the equilibrium level associated with the F reference, fluctuations in biomass are expected and do not represent harm. The industry perspective that haddock needs rebuilding is

perhaps based on absence of haddock from traditional grounds and smaller size of fish in the catch. For example, no haddock are being caught off Cape Sable Island by those still fishing there. The prevailing view is that the percentage of haddock less than 43 cm is greater now than in previous years, reflecting reduced growth. This perception will be checked against changes in survey length composition during recent decades.

Fishery

To the extent possible, landings could be distinguished for the Scotian Shelf and Bay of Fundy in future.

Fishermen noted that the seasonal patterns are a month or two later in recent years. This may have implications for survey indices. If seasonal movements of small fish to the inshore areas that are not covered by the survey are delayed, this could result in disproportionately more small fish caught during the survey.

Weight/Catch at Age

The disparity during the mid-1980s in the trend for weight at age between survey and fishery should be investigated. The declines in fishery weight at age are more pronounced at older ages. Also, there does not appear to be a change in the partial recruitment to the fishery reflecting the decrease in size at age. Further, the management implications of the more pronounced growth changes for the Scotian Shelf compared to the Bay of Fundy should be considered.

The abrupt change in age composition from 1987 to 1988, which is coincident with a change in size at age, should be corroborated by a commensurate change in length composition.

For recent years, the catch at age and weight at age are determined using an annual length weight relationship derived from the RV survey. In past, seasonal length weight relationships, constant over years, were used. The justification for the change in practice should be documented.

Survey Biomass Indices

The surveys suggest that the proportion of biomass in the Bay of Fundy is declining while the proportion of the catch coming from the Bay of Fundy is increasing. Comparison of recruitment indices by area indicate that several yearclasses, 1997-2000, appear strong on the Scotian Shelf but only the 1998 yearclass appears strong in the Bay of Fundy. Survey age composition for Scotian Shelf displays an expanding age range in recent years while the age range for the Bay of Fundy remains truncated. Also, the relative F by area, calculated as total landings divided by ages 4+ survey biomass, shows a declining trend on the Scotian Shelf but remains relatively stable in the Bay of Fundy. These observations suggest that exploitation in the Bay of Fundy may be too high and is hampering rebuilding and expansion of the size/age structure of the population in this area.

VPA Results and Projections

A VPA for a shorter time period of recent years, say from 1988 on, could be examined to determine if the retrospective pattern persists. Also, the impact of truncating the age range to ages below 10 could be investigated.

The reduction of fishing mortality rate for 2005 indicated by the VPA is supported by reports by fishermen of less effort in 4X, and in particular, less activity in January-February when fishermen favoured going to Georges Bank. Also, landings in first half of year for 2005 were down. Nevertheless, some of the reduction may just be apparent as a result of the retrospective pattern.

The interpretation of fishing mortality rate for ages 5-7 relative to the F reference needs qualification to indicate that these ages are not fully recruited to the fishery. Further consideration should be given to the fishery partial recruitment pattern as it affects the determination of an F reference and the calculation of an annual summary F statistic.

Consideration should be given to how the split in fishing between the Scotian Shelf and the Bay of Fundy affects the weight at age and fishery partial recruitment used for projections.

Research Recommendations

See text.

It was agreed that the working document be revised and completed as a **Research Document**.

4VWX5 WHITE HAKE

Remit

- Report on all current removals, including surveys and commercial bycatch
- Report on abundance and distribution trends from the DFO summer bottom trawl survey

Working Paper: Bundy, A., and J. Simon. 2005. White Hake (*Urophycis tenuis*) in 4VWX and 5. RAP Working Paper 2005/021.

Presentation Highlights (Presenter: A. Bundy)

Landings throughout 4VWX5 have declined from a peak of 8700 t in 1987; since 2003 landings have been below 2000 t, reflecting quota caps. White hake is managed as a bycatch in longline, gillnet and otter trawl fisheries targeting halibut, redfish, cod, pollock and other groundfish. This has implications for quota management in a mixed groundfish fishery. There are very few large white hake on the Scotian Shelf (4VW) now compared to the 1980s, despite reduced catches in all areas and indications of good recruitment. In 4X/5, there has been a general decrease in the abundance of white hake since the early 1990s. Fishing mortality is relatively low in all areas since the introduction of catch limits in 1996. Total mortality on the Scotian Shelf is high and its causes are unknown. Total mortality of white hake in the Bay of Fundy is variable without trend. The status of white hake in 4Vn and 4VsW is poor and requires rebuilding. Unless there is good recruitment in 4X/5 over the next few years, catches at the current level may lead to further decreases in abundance.

Discussion (Rapporteur: M. Power)

Fishery

Landings from the earlier period had large amounts of unspecified categories that may have a proportion of hake. It may be possible to prorate the earlier NAFO data using ZIF to extend the time series. This issue had been raised at the framework in 2001. Species misreporting may also be an issue in recent years (late 1980s) when there was hake quota available after other species quotas were reached. These amounts may never be quantified, but there are possible data to examine (i.e., export data - one year there were more exports than reported landings).

Survey Biomass Indices and Commercial Catch Rates

Data before 1981 probably are overestimating white hake due to species identification protocol change. The *Teleost vs. Needler* comparison for 2004-2005 should be shown on the plots. The commercial catch rate comparison (Fig. 6 of the Res. Doc.) does not appear coherent between series in 4Vn. Instead of time series a correlation analysis might make the analysis better. The timing of different surveys also has an effect. There is a declining trend in recent years in total numbers in 4X (Fig. 8 of the Res. Doc.) and no other sources of mortality have been shown. Is this related to the level of removals in the fishery? There are smaller fish in the eastern part but not older/larger sizes. Since the quota cap is there any improvement in the size composition?

Research Recommendation

Commercial length data should be analyzed.

It was agreed that the working document be revised and completed as a **Research Document**.

4VWX SILVER HAKE

Remit

- If the 2005/06 TAC for silver hake is continued into 2006/07, evaluate whether or not:
  - Fishing mortality will be maintained at a moderate level
  - Biomass will increase

Working Paper: Showell, M.A., G. Young, R.K. Mohn, and G.M. Fowler. 2005. Assessment of the Scotian Shelf Silver Hake Population through 2005. RAP Working Paper 2005/025.

Presentation Highlights (Presenter: R. Mohn)

While for many years the silver hake fishery was concentrated on the shelf edge, since 1997 the majority of catches have been taken in Emerald and LaHave basins. Since the mid-1990s, the proportion of young fish in the catch has increased. There has been a generally decreasing trend in biomass from the RV survey since the 1980s. Total biomass and abundance increased from 2002 to 2004, but has decreased in 2005 to a level close to the lowest in the time series. Relative F does not display any strong trends in the past decade and is expected to remain in the range observed, if the current quota is maintained. The 2003 yearclass is below average,

but the 2002 and 2004 yearclasses are large at about twice average and among the highest in the times series. Recent good recruitment has not been translated into a higher biomass. Early indications are that the 2004 yearclass is also strong, however, it cannot be determined if this will result in an increase in biomass.

Discussion (Rapporteur: C.J. Allen)

Following the presentation it was clear why there has not been a VPA carried out on this stock given the strong retrospective patterns observed. In response to questions as to why much of the 2005 data, including the survey and catch data, was not included in the presentation, it was explained that silver hake cannot be aged quickly (otoliths have to be clarified in glycerin for several months) so ageing data were not available, however size data should be available and should be included now. The majority of the fish being caught is quite small so it would be helpful to look at as current information as possible when assessing this stock.

Fishery

There were some questions concerning the separator grate that had been made mandatory on foreign fleets in 1990 and domestic fleets in 1994 and how effective it has been in avoiding bycatch of other groundfish species. Although the data were not readily available for this session, the data on bycatch are available and have been presented before.

The pre/mid-1990s foreign vessel fishery for silver hake was prosecuted on the slope outside the Small Mesh Gear Line (SMGL) and caught a higher proportion of larger/older fish. The post mid-1990s domestic fishery for silver hake has been largely prosecuted in the basins of the Scotian Shelf and fewer large/old fish are caught.

It was noted that many of the anomalies in the data took place around the time the foreign fleets left and the domestic fleets took over the fishery; foreign fisheries took place on the shelf whereas the domestic fishery is almost entirely in the basins.

Stock Structure

When discussing stock structure it was noted that previous work indicated that there was small fish in the basin area, which could possibly be a juvenile area, and that once the fish reach a certain size they may migrate to other areas, such as the shelf although more study is needed on this. It is suggested that the stock cannot be fished out by fishing only in the basin. Also, domestic trawlers cannot tow fast enough to catch the larger fish similar to the foreign fishery. One industry participant believed that there might well be three separate stocks – one in the Bay of Fundy/Gulf of Maine, one on the Shelf and one in the Basin.

Commercial Catch Rates

There was agreement at the RAP Data Input Meeting that the present standardized commercial catch rate series cannot be used as an index of relative abundance due to a number of factors including changes and constant refinements in fishing strategy and markets (and it was agreed that the use of commercial catch rates should be explored in a working group prior to the 2006 assessment). However, this is somewhat inconsistent with comments made during the present meeting where the Industry stated that they feel catch rates have been good and that the stock is improving (see *Additional Stakeholder Perspectives* in the SAR).

Survey Biomass Indices

Although the fishery now takes place only in the basin, the RV survey covers both the basin and the shelf, including the area where foreign fleets used to operate, although it was questioned whether it sampled deep enough in the latter area where the hake are found. It was explained that the survey takes place during the summer when hake are spawning and are widely distributed; the survey covers the distribution of the stock pretty well, while the commercial fishery only takes place in small area. There are no fisheries taking place outside of the RV survey area. There were a couple of test fishing trips to the shelf this year so it might be interesting to compare these results to basin-caught fish. There have been larger fish caught in the basins in the past, although there has not been a big difference in survey data between the basin and the shelf, so if there is somewhere where the older, larger fish are it is likely in deeper water rather than where the location of the RV surveys. This led to speculation that perhaps there are large amounts of fish on the edge of the shelf in the deep water where there is no current fishery and the RV survey does not sample.

The bulk of the stock is composed of younger ages and it was suggested that evidence for the improvement in biomass was weak and inferential. The 2002 and 2004 yearclasses are amongst the highest in the time series and their strength was a big part of the assumption that the biomass would be increasing. However, after some discussion it was agreed that any increase would be modest and no great overall increase in the biomass.

Trends in F

There was considerable discussion on fishing mortality (F) and relative F. There are currently no reliable estimates of F so relative F was calculated as the ratio of the commercial catch to the biomass from the July RV survey. Current relative F levels suggest exploitation is low relative to the 1970s. The group was reminded that in the past the fishery took place all over the shelf area (primarily foreign fishery) and that both catches and relative F were quite high then compared to what they are now. It was suggested that discussion take place regarding relative F since the 1990s although some participants were not comfortable discussing relative F in relation to time periods. Relative F does not display any strong trends in the past decade.

General

It is difficult to reconcile the indications of good recruitment and low fishing mortality in recent years with the low abundance at older ages, in both the survey and the catch. It is recognized that the introduction of the grate and changes in fishing location will contribute to changes in the catch at age frequencies. While this may be due to an increase in natural mortality, potential complications due to stock structure should be evaluated.

Research Recommendations

It is suggested that the following (for all available years to 2005) would be useful in the evaluation to better understand these potential complications due to stock structure: foreign fishery catch at age (available in historical Res. Docs.); domestic fishery catch at length/age* and survey index at length/age from the slope outside the SMGL, the basins, the Bay of Fundy/Gulf of Maine, and the remainder; and information relevant to stock structure and seasonal migration or distribution by size/age.

It was agreed that the working document be revised and completed as a **Research Document**.

GENERAL COMMENTS

Data and Interpretation

Monitoring and Sampling

The most basic requirement for evaluation of stock status is to know, without error, the removals by the fishery (i.e., the amount and location of catch). The current monitoring (land-based and at-sea) does not necessarily supply this information. *Effective* monitoring is required, and the effectiveness and accuracy of the current monitoring systems should be examined.

In some cases increased sampling levels are required both at-sea and in port. Sampling needs to be an accurate reflection of the fishery as a whole and this may be compromised by regulatory concerns (e.g.. Observer sampling) or limited resources.

Survey Data – Conversion Factors

The time series of survey data from the *Needler* was interrupted in 2004 when the *Teleost* was used to conduct the bottom trawl survey. While the 2004 point was considered in the analyses (in particular, using a 1:1 conversion in the analytical assessments for pollock and haddock), the conversion factor calculations from the comparative fishing experiments are not yet complete, and the 2005 calculations were only an approximation.

Trends

In future, observed trends and correlations should be supported by appropriate analyses.

Process

Remits

Remits should be developed well in advance of the meeting and include when the information is required, the specific decisions to be made with respect to fisheries, oceans, and habitat management, and the analyses required to provide the information needed for those decisions. Portions of the 2005 remit were unclear or nonsensical.

RAP Data Input Review

It was generally agreed that the Data Input Review Meeting (Appendix 6) held prior to the Scientific Peer Review Meeting was very worthwhile and should be continued as a part of the formal RAP process in the future.

Science Advisory Report (SAR) Format

The fishing industry liked the Additional Stakeholder Perspectives section and felt it was a useful addition to the document structure/content.

The Group found the new template for the SAR to be awkward and the template guidelines were not clear. This lead to inefficiencies and a concern that the final product containing the peer reviewed scientific advice, was not the most useful or effective that it could be.

Follow-up Process

The Group noted an important deficiency in the follow-up process. The role of Science is to evaluate the risks and consequences of alternative management actions. A formal step is required following RAP where the science advice and other considerations are balanced and a report is produced giving recommendations for the management actions and the rationale. This step should be public, open and transparent. The change in FRCC mandate has left a void in this regard.

CLOSING

The Chair reiterated that the conclusions of the current deliberations would not be finalized until the SARs had been made public.

The Chair concluded the meeting by thanking all participants, including the presenters and rapporteurs, for their active participation. She noted that there was still a good-sized group remaining at the end of the session, which is important in reaching a true consensus on the SAR texts.

The Proceedings were subsequently adopted by correspondence (Appendix 7).

Appendix 1. List of Participants

Participant	Affiliation/Address	Telephone	Fax	E-mail
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* Present at close of meeting

** By telephone for silver hake sessions

Appendix 2. Letters of Invitation

Fisheries and Oceans Canada / Pêches et Océans Canada

14 September 2005

Distribution:

Subject: **Invitation to Maritimes Region RAP Meeting, Fall 2005**

The 2005 Maritimes Region Assessment Process for groundfish stocks on the Scotian Shelf will be split into two sessions: RAP Data Input Consultations (18-19 October) and RAP Scientific Peer Review (31 October - 4 November). The remit for the 2005 RAP is attached.

The intention of having two RAP sessions is to (1) strengthen the Data Input Consultation aspect of the RAP process, and (2) ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The RAP Data Input Consultations are about 2 weeks before the scientific peer review: late enough to allow time to have the data inputs ready, but early enough so there is enough of a gap before the Peer Review meeting to incorporate the feedback from the Data Input meetings. The final goal is to develop stock status conclusions and advice and complete the Science Advisory Report (SAR).

Presentation and discussion of data inputs to the assessments will occur at the RAP Data Input Consultation Meetings (Yarmouth and Shelburne – see agenda attached). Presentation and discussion of the outcome from this first meeting, the subsequent analyses conducted, and the formulation of the "Conclusions and Advice" portion of each SAR will occur during the 4-day RAP Scientific Peer Review meeting (St. Andrews Biological Station).

The agendas are attached. Please note, sessions will start on time, and the timing on the agendas will be adhered to as closely as possible.

If you plan to accept this invitation, please inform Michele Saunders (ph: 506-529-5835; fax: 506-529-5862 or e-mail: saundersme@mar.dfo-mpo.gc.ca) at your earliest convenience.

Yours sincerely,

Julie M. Porter

Julie M. Porter
Chairman

Head, Population Ecology Section
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Attachments

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Canada

Fisheries and Oceans Canada | Pêches et Océans Canada

12 October 2005

Distribution:

Subject: **Revision to the Agendas for the Maritimes Region Groundfish RAP Meeting, Fall 2005**

Please be advised that 3NOPs4VWX Atlantic Halibut will not be included in the upcoming RAP Data Input Consultations (18 October) or RAP Scientific Peer Review (31 October - 4 November). The RAP Scientific Peer Review meeting for 3NOPs4VWX Atlantic Halibut has been postponed until 25 January 2006.

The revised agendas for the fall 2005 Maritimes Regional Advisory Process on Scotia-Fundy Groundfish Stocks are attached.

Yours sincerely,

Julie M. Porter

Julie M. Porter
Chairman

Head, Population Ecology Section
(Tel: 902-529-5925)
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Appendix 3. Agenda

Maritime Provinces Regional Advisory Process on
Scotia-Fundy Groundfish Stocks
Scientific Peer Review

31 October – 4 November 2005
Hache Conference Centre, Biological Station, St. Andrew's, NB

Agenda[1]

31 October – Monday

1330 - 1400 Welcome and Introduction (Porter)
1400 - 1500 Overview of Scotia-Fundy Groundfish Fisheries Distribution (Clark)
1500 - 1700 4VWX5Zc Pollock (Neilson)

1 November – Tuesday

0830 - 1030 4X Cod (Clark)
1030 - 1230 4X / 5Y Haddock (Hurley)

1230 - 1315 Lunch[2]

1315 - 1500 4VWX5 White Hake (Bundy)
1500 - 1700 4VWX Silver Hake (Mohn)

2 November – Wednesday

0830 - 1200 Report Review

1200 - 1300 Lunch[2]

1300 - 1630 Report Review

3 November – Thursday

0830 - 1200 Report Review

1200 - 1300 Lunch[2]

1300 - 1900 Report Review

[1] RAP Scientific Peer Review for 3NOPs4VWX Atlantic Halibut has been postponed until 25 January 2006.
[2] **Lunch** will be provided Tuesday to Thursday in the Hache Conference Centre. **Health breaks** will be provided mid-morning and mid-afternoon.

Appendix 4. Remit

Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks

RAP Data Input Consultations: 18-19 October 2005 (Yarmouth and Shelburne)
RAP Scientific Peer Review: 31 October – 4 November 2005 (St. Andrew's, NB)

Remit

Background

Each fall, the DFO Maritimes Science Branch reviews the status of Scotia-Fundy groundfish stocks. The 2005 RAP fall review will be split into two sessions – RAP Data Input Consultations (18-19 October) and RAP Scientific Peer Review (31 October – 4 November). The focus of the 2005 groundfish RAP will be on the resources indicated below.

Objectives

The following issues will be addressed for each stock in order to develop scientific consensus through peer review:

4X / 5Y Cod

- Evaluate the completeness and accuracy of fishery statistics for cod in 4X/5Yb for 2004/05, commenting on implications for status determination.
- Determine if the biomass and fishing mortality rate of cod has increased or decreased. Evaluate the prospects for rebuilding if catches are maintained at the current TAC of 5,500t. Provide details for the Bay of Fundy and Scotian Shelf separately.

4X / 5Y Haddock

- Evaluate the completeness and accuracy of fishery statistics for haddock in 4X/5Yb for 2004/05, commenting on implications for status determination.
- Given apparent changes in growth rate and productivity of the 4X haddock resource, describe the implications for harvest strategy.
- Determine if the biomass and fishing mortality rate of haddock has increased or decreased. Evaluate the prospects for rebuilding if catches are maintained at the current TAC of 8,000t. Provide details for the Bay of Fundy and Scotian Shelf separately.

4VWX 5Zc Pollock

- Report on the status of Southwest Pollock (DFO Unit Areas 4Xopqrs and 5Yb and NAFO Subdivision 5Zc), updating results for the latest information from fisheries, including all bycatch and discard estimates, and from research surveys.
- For a range of Southwest Pollock TAC options in 2006/07, estimate the risk that the
    - 2006/07 fishing mortality rate would exceed the $F_{ref} = 0.2$
    - biomass at the beginning of April 2007 would not achieve a 0%, 10% or 20% increase compared to the beginning of April 2006
- Report on the status of North-eastern Pollock (NAFO Divisions 4VW and DFO Unit Areas 4Xmn), updating results with the latest research survey for trends of abundance, total mortality rates and biomass ratio of North-eastern to South-western Pollock.

- Examine the implications on the biological stocks as defined in the assessment framework of maintaining the current management unit. Comment on how Fisheries Management could accommodate these implications.

3NOPs4VWX Atlantic Halibut [postponed to January 2006]

- Report on all current removals, including surveys and commercial bycatch of Atlantic Halibut
- Report on recent catch rate and distribution trends from the Atlantic Halibut industry survey
- Evaluate whether or not these trends indicate positive or negative stock status. Report on these trends for small (<81 cm) and large (>81 cm) fish

4VWX Silver Hake

- If the 2005/06 TAC for silver hake is continued into 2006/07, evaluate whether or not:
  - Fishing mortality will be maintained at a moderate level
  - Biomass will increase

4VWX5 White Hake

- Report on all current removals, including surveys and commercial bycatch
- Report on abundance and distribution trends from the DFO summer bottom trawl survey

Products

CSAS Science Advisory Report (SAR) for each resource
CSAS Proceedings summarizing the discussion
CSAS Research documents for each resource

Participation

Participation at the RAP meeting will be solicited from the following:
- DFO Science & Fisheries Management
- FRCC
- Industry

Appendix 5. List of Documents Tabled and Produced

Bundy, A., and J. Simon. 2005. White Hake (*Urophycis tenuis*) in 4VWX and 5. RAP Working Paper 2005/021.

Clark, D.S. 2005. Assessment of Cod in Division 4X in 2005. RAP Working Paper 2005/022.

DFO, 2004. Proceedings of the Maritimes Regional Advisory Process on Scotia-Fundy Groundfish Stocks; 22-24 November 2005. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2004/037.

DFO, 2005. Proceedings of the Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks; 31 October - 3 November 2005. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2005/032. Appendix 6: Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks Data Input Meetings.

Hurley, P.C.F., G.A.P. Black, G.A. Young, R.K. Mohn, and P.A. Comeau. 2005. Assessment of the Status of Division of 4X/5Y Haddock in 2005. RAP Working Paper 2005/023.

Neilson, J.D., and P. Perley. 2005. 2005 Assessment of Pollock in 4VWX and 5Zc. RAP Working Paper 2005/024.

Showell, M.A., G. Young, R.K. Mohn, and G.M. Fowler. 2005. Assessment of the Scotian Shelf Silver Hake Population Through 2005. RAP Working Paper 2005/025.

Science Advisory Reports Produced

DFO, 2005. Cod on the Southern Scotian Shelf and in the Bay of Fundy (Div. 4X/5Y). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/057.

DFO, 2005. Haddock on the Southern Scotian Shelf and Bay of Fundy (Div. 4X/5Y). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/056.

DFO, 2005. Pollock in Div. 4VWX and 5Zc. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/055.

DFO, 2005. Silver Hake on the Scotian Shelf (Div. 4VWX). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/059.

DFO, 2005. White Hake in 4VWX and 5. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/058.

Appendix 6. Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks Data Input Meetings (18 October 2005, Yarmouth Rodd Grand)

Silver Hake RAP Data Input Review: 1530-1715
Pollock, Cod, Haddock, White Hake RAP Data Input Review: 1730-2130

1. INTRODUCTION

Each fall, the DFO Maritimes Science Branch reviews the status of Scotia-Fundy groundfish stocks. The 2005 RAP fall review is split into two sessions: RAP Data Input Meetings (18 October) and RAP Scientific Peer Review (31 October - 4 November). The intention is (1) to formalize the consultation aspect of the RAP process and (2) to ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The RAP Data Input Meetings are about 2 weeks before the scientific peer review: late enough to allow time to have the data inputs ready, but early enough so there is enough of a gap before the Peer Review meeting to incorporate the feedback from the Data Input Meetings. The 2005 RAP Data Input Meetings were chaired by the 2005 Groundfish RAP Chair (Dr. Julie M. Porter). The Agenda is attached as Annex 1 and the Lists of Participants as Annex 2.

2. OVERVIEW OF OCEANOGRAPHIC CONDITIONS

A summary of the 2005 environmental conditions on the Scotian Shelf (SS) and eastern Gulf of Maine (GoM) and Bay of Fundy (BoF) was compiled using available data (up to September). Notable was the absence of satellite data and research vessel survey nutrient data, both of which are considered essential elements of the environmental review.

Surface conditions in 2005:

- Air temperature conditions: close to normal during spring, above normal during summer.
- July ocean surface temperature: about normal on the Eastern Scotian Shelf; generally colder on western SS/BoF.
- Ice extent: slightly less than normal in 2005, carrying on ~10yr trend of reduced ice coverage (note 2003 when it was much greater than the average).
- Sable Island windstress: about normal; winter and spring winds more southerly.

Bottom layers in 2005:

- In 2005 near-bottom temperatures generally close to normal.
- Small areas near shelf-break, warmer than normal.
- Eastern Georges Bank about 1-2 degrees *colder* than normal.

It was agreed that more specific and relevant data could be collected with the help of the fishing industry and that the summary of the oceanographic conditions could be made more pertinent to the discussions if the proposed data are collected and presented.

3. REVIEW OF DATA INPUTS

SILVER HAKE

Presentation Highlights

This resource continues to display a mixture of attributes. Growth at present is poor, with condition and length-at-age below long term averages. However, there have been modest improvements for both these indicators in recent years. Current relative F levels suggest exploitation is low relative to the historical period. Total mortality, which had been high in the late 1990s, has dropped to moderate levels. The 2004 yearclass is thought to be very large, and with lower total mortality and increased growth, the stock biomass should increase. However, while the trend in some biological characteristics appear promising, this has not yet translated into a higher biomass, as the most recent survey estimate is close to the lowest in the time series.

Discussion

Commercial Catch Rates: There was considerable discussion on the commercial catch rate series. The fishing industry questioned the appropriateness of standardizing the CPUE series to the month of July as the fishing industry feels that catch rates generally drop in July. It was explained that the CPUE series is intended to be a *relative* index of abundance, not an absolute measure, and therefore is should not matter which month the data are standardized to. However, it was agreed that the CPUE series could be standardized to another month when catch rates are higher, for illustrative purposes. Another possibility is to standardize the CPUE to the mean of the series.

Further discussion on the silver hake commercial catch rate series lead the group to conclude that the present CPUE series cannot be used as an index of relative abundance due to a number of factors including changes and constant refinements in fishing strategy and markets. The group agreed that it would useful to choose a subsample of the trips and captains (as has been done for pollock), and to add an additional level of sampling for these indexed fishermen. This should be explored in a working group prior for the 2006 assessment.

Age Composition: It was confirmed that both the 2002 and 2004 yearclasses appear to be strong. It was requested that bubble plots be prepared for the RAP Peer review Meeting.

Size Composition: In the discussion on the weights at age over the time series, it was noted that about 1990 something changed. The fishing industry asked if the data could be split into "slope" and "basin" data. It was also suggested that the confidence intervals be added to the points to give an indication if for example the early years show more variation. It was observed that although there is a decline in the weights at age from about 1975 to the last 1980s, after about 1990, the trend in weights at age appears stable. It was requested that there be a trend analysis or some sort of smoothing to further examine this observation. It was also requested that the weight at age anomalies be examined in relation to the temperature anomalies in the previous talk.

RV Surveys: The bottom trawl survey results were discussed and the fishing industry expressed concern that the surveys do not sample the basins where the silver hake generally are found. It was explained that the surveys are conducted in July, when the silver hake are coming out over the shelf to spawn and that this is coincides with the survey. The fishing industry expressed further concern that because the seasons seem later this year, the timing of the survey might miss the silver hake on the shelf.

Conclusion: While the group recommended that the present CPUE series not be used as an indication of relative abundance, there was general consensus that the silver hake data presented are consistent with the observations of the fishing industry.

POLLOCK

Presentation Highlights

DFO Science showed that the relatively strong 1999 yearclass, was again noteworthy in 2005. This yearclass has contributed to a slight expansion of the age composition of the catch and indices. The recent fishery CPUE has increased compared with 1999, but the increase is supported by higher catch rates in two unit areas only (4Xp and 5Zc). The fishery distribution continues to be spatially constricted. There is a trend of declining weights at age.

Discussion

Distribution: The comment was made by the fishing industry that the distribution of pollock is different in 2005. "Pollock are everywhere." It was noted that the large pollock are in deeper water and that is why they are not being caught in the ITQ survey, and generally, pollock are not being seen in shoal water. However, DFO Science noted that the depth range referred to by industry in Div 4X is not outside of the depths surveyed during the summer research vessel survey. A number of members of the fishing industry also noted that small pollock are being seen in the water column when fishing inshore waters for mackerel. In 2005 there were many more small pollock seen in this situation. This was offered as a possible explanation for the absence of age 2 and 3 in the RV and CPUE indices at age. The fishing industry also observed that they are seeing large fish in their catches, consistent with the data presented by Science. It was emphasized that the distribution of pollock is patchy ("in pockets") and this makes it difficult to survey. There were observations that there is considerable pollock in the eastern portion of the Western Component (LaHave Bank).

Quota and Fishing Strategy: There was considerable discussion by the fishing industry about the restrictive pollock quota, and how it interacts with the cod and haddock fisheries, and the associated fishing strategy. This could have a substantial effect on the commercial catch rate series. It is very difficult to define a trip as pollock-directed given the quota and market constraints. It was noted that most pollock caught by the ITQ fleet was taken as bycatch in 2005. It was also noted that there is considerable demand for pollock quota, since it is the limiting species in the fishery, and this also influences the fishing strategy. In response, Science noted that a trip is considered pollock-directed if 50% or more of the landed weight is pollock. There is also a selection process that only includes established pollock fishers (at least five years of directed catch).

RV Surveys: Concern was expressed by the fishing industry that during 2004 and 2005 there has been a lot of pollock on Georges Bank at the time that the bottom trawl survey is elsewhere, and that it would be useful to have information from Georges Bank in the summer. Science noted that the Georges Bank survey (February) does show a spike in 2005, and that information from the Georges Bank fishery is taken into account in the analyses.

Conclusion: The fishing industry expressed considerable concern that the assessment for pollock is divergent from their observations; "pollock are everywhere". Science emphasized the declining weight at age over the time series and the more constricted distribution of the fishery are negative signs that should not be ignored. The fishing industry also expressed concern

about the boundary between the two pollock components, but it was agreed that this would be addressed by the remit question.

COD

Presentation Highlights

Despite the low landings in recent years, there has been no increase in biomass for 4X cod. Instead, there has been some decline in biomass as indicated by survey catches. Mortality estimates show no indication of decline. The recent surveys indicate that there may be improved recruitment for the 2003 yearclass (which will recruit to the fishery in 2006). The last promising yearclass was the 1998 yearclass; however this yearclass depleted quite rapidly, and at age 7 is now quite small.

Discussion

Tagging Data: The fishing industry asked if the data from the tagging analyses are available; Science responded that the analyses will be conducted over the winter and will be available for next year.

Distribution and Abundance: There were a number of observations that landings and effort are both down in 2005. More effort has been targeted on Georges Bank. It was noted that in 2005 there were not as many cod in the Basin in April to mid-May. Handline fishermen also noted that there is very little fish inside.

Quota and Fishing Strategy: A combination of the catch rates, the quota and economics (especially high fuel prices, and the exchange rate) make it not worth fishing for cod, and therefore the quota may not be caught for these reasons.

Size Composition: The fishing industry agreed that the size composition data presented was consistent with their observations.

Conclusions: The fishing industry was generally in agreement with the cod data presented by Science.

HADDOCK

Presentation Highlights

Haddock biomass in 4X5Y from the Research Vessel and ITQ surveys decreased in the last 2-3 years from high levels in the late 1990s / early 2000s. Biomass is near the long-term average on the Scotian Shelf but below the long-term average in the Bay of Fundy. Recent recruitment has been good; the 1998, 1999 and 2000 yearclasses are all above average, and 2003 is also above average. Relative fishing mortality has been low. Growth rate has decreased and size at age is small. The population is dominated by small fish. Small fish are being landed.

Discussion

Distribution: The handline industry noted that they are seeing an absence of haddock in the shoal water (as for cod). This observation is consistent with the survey in the Bay of Fundy. Science noted that the results from the RV survey were not that low overall, but observations

from the fishing industry indicate that haddock are hard to find. Is this because of fish size or because effort has shifted to Georges Bank?

Quota and Fishing Strategy: Again it was noted that the economics are not there for fishing haddock, given the high cost of bait and fuel.

Size Composition: Concern was expressed in the decline in the weight at age; some fish that are not big enough to sell (for US markets) are however fully reproductive. It was noted that Georges bank also has had a decline in the weight at age. It was requested that bubble plots be prepared for the RAP Peer review Meeting.

Conclusions: The fishing industry was generally in agreement with the haddock data presented by Science.

WHITE HAKE

Presentation Highlights

Total landings have declined since 1987. Landings from all areas have decreased since 1987 and most (90%) of the catch is now taken from 4X/5. Since 1996, white hake has been a bycatch fishery. Landings by longline gear have decreased since the mid-1990s and white hake is now caught by otter trawl, longline and gillnets in similar proportions. Abundance measured from the Research Vessel Survey is low in all areas: abundance in 4Vs was low in the 1970s, peaked in the mid-1980s and has been low since 1987; similarly in 4W, abundance was low in the 1970s, peaked throughout the 1980s, and has been low since 1992 - the mean weight per tow and mean numbers per tow in the 2002 and 2003 and 2005 are all time lows; abundance in 4X in terms of both mean number and weight per tow was lower in the 1970s and 1990s than in the 1980s, although the point in 2005 is higher than in most recent years - there has been a declining trend of peaks since the early 1980s, and it is likely that the 2005 point is one more in this series. The proportion of large fish (> 45 cm) in the population has declined in 4Vn and 4VsW, and is below average in recent years in 4X, indicating a loss of larger, mature fish in the population. Fish condition is variable around the long term mean. The area-occupied by white hake >45 cm has decreased since the mid 1980s in 4VsW.

Discussion

Spawning Time: It was asked when and where white hake spawn. Subsequent to the meeting, it was explained that it is thought that white hake spawn on the Scotian Shelf in the summer and in deeper slope waters during the winter/early spring, and that there is on-going research to better answer this question.

Species Identification: Questions were asked about the accuracy of the landings data due to the inconsistent species identification in the earlier part of the time series. It was requested that there be clarification about the separation of the red and white hake data both in the commercial catch and in the RV survey data at the RAP Peer Review Meeting.

Conclusions: The fishing industry was generally in agreement with the white hake data presented by Science.

4. GENERAL DISCUSSION

There was a brief general discussion about a number of commonalities among the Scotia-Fundy groundfish fisheries.

Quota and Fishing Strategy: There is a complicated interaction between the quotas (some of which are very restrictive), the markets and the economics (e.g., fuel). It is difficult to determine how to determine which species is being targeted on a trip, and it was noted that this might change within a trip as conditions change. The group did think it could be useful to review the usefulness of the log records and if there cold be better information captured regarding the species being targeted. The recent review of the groundfish logs did not include input from the scientists directly responsible for the Scotia-Fundy groundfish assessments.

Weights at Age and Condition: There seems to be a general decline in the weights at age and the condition of fish. This has been noted in recent state of the ecosystem reports.

Distribution: There is a lack of commercial species in the shoal/coastal waters. The fishing industry noted that there is an abundance of dogfish in inshore waters. Science noted that this shrinking distribution could well be a density-dependent effect.

5. CLOSE

The chairman noted that in the future, there should be paper copies of the data inputs to ensure a thorough review of the data inputs.

The fishing industry thanked DFO Science for having these sessions and they appreciated the chance to comment on the data inputs in advance of the stock assessment session. The Chairman thanked all of the participants for their participation and their constructive review. The meeting closed at 21:30.

Annex 1. Agenda

Maritime Provinces Regional Advisory Process on Scotia-Fundy Groundfish Stocks Data Input Consultations (18 October 2005)

Agenda*

Background

Each fall, the DFO Maritimes Science Branch reviews the status of Scotia-Fundy groundfish stocks. The 2005 RAP fall review will be split into two sessions: RAP Data Input Consultations (18 October) and RAP Scientific Peer Review (31 October - 4 November). The intention is (1) to formalize the consultation aspect of the RAP process and (2) to ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The RAP Data Input Consultations are about 2 weeks before the scientific peer review: late enough to allow time to have the data inputs ready, but early enough so there is enough of a gap before the Peer Review meeting to incorporate the feedback from the Data Input meetings. 2005 RAP Data Input Consultations will be chaired by the 2005 Groundfish RAP Chair (Dr. Julie M. Porter).

The focus of the fall 2005 groundfish RAP will be on the resources indicated below:

Silver Hake RAP Data Input Review

Date: 18 October (Tuesday)
Time: 1530-1700
Place: Yarmouth, Rodd Grand

Pollock, Cod, Haddock, White Hake RAP Data Input Review

Date: 18 October (Tuesday)
Time: 1730-2100
Place: Yarmouth, Rodd Grand

The meetings will follow the format below:

1. Introduction
2. Overview of oceanographic conditions
3. For each stock
   - Description of the fishery
   - Sampling and catch-at-age
   - Abundance indices
   - Questions of clarification
4. General discussion
5. Close

*Halibut RAP Data Input Review – postponed until January 2006

Annex 2. List of Participants

RAP Data Input Meetings - Silver Hake (October 18, 2005 – 15:30h)

Name	Affiliation/Address	Phone/Fax	e-mail
Baker, Randy	Zeus Seafood Inc. 33 Bakers Point Road, RR#2 Jeddore, NS B0J 1W0	902-845-2500 (T)	zeusseafood@eastlink.ca
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RAP Data Input Meetings – Cod, Haddock, Pollock, White Hake
(October 18, 2005 – 17:30h)

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Appendix 7. Letter for Adoption of Proceedings

Fisheries and Oceans Canada / Pêches et Océans Canada

28 November 2005

Distribution: 2005 Fall RAP Participants

Subject: **Adoption of the Proceedings of the Fall 2005 RAP Meeting**

On behalf of the Maritimes Region, thank you for your participation in the recent Maritimes Region Assessment Process for groundfish stocks on the Scotian Shelf (18 October, and 31 October to 3 November 2005).

Please find attached the draft proceedings of the meeting for adoption by correspondence. **Please advise me of any changes or corrections by 6 December 2005.** Please refer to specific page and line numbers when noting changes or corrections. If I have not received any comment from you by 6 December 2005 that will indicate that you have no changes or corrections to make on the attached draft.

Please do not hesitate to contact me if you require further clarification.

Thank you for your cooperation. It has been a pleasure to work with you.

Yours sincerely,

Julie M. Porter

Julie M. Porter
Chairman

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Attachment

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